

Application No. 10/603,449

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings of claims in the application:

1. **(Original)** A toner process comprised of a first heating of a colorant dispersion, a latex emulsion, and a wax dispersion in the presence of a coagulant containing a metal ion; adding a silicate salt; followed by a second heating.

2. **(Currently Amended)** ~~A process in accordance with claim 1~~ A toner process comprised of a first heating of a colorant dispersion, a latex emulsion, and a wax dispersion in the presence of a coagulant containing a metal ion; adding a silicate salt; followed by a second heating, and wherein said first heating enables toner aggregates, and said second heating provides coalesced toner particles, and wherein said first heating is below about the glass transition temperature of a polymer contained in said latex; and said second heating is above about the glass transition temperature of the polymer contained in said latex, and wherein said silicate salt is sodium silicate or potassium silicate.

3. **(Original)** A process in accordance with **claim 2** wherein there is added to the formed aggregates said silicate salt of a sodium silicate dissolved in sodium hydroxide.

4. **(Currently Amended)** A process in accordance with **claim 2** wherein the amount of silicate salt selected is from about 0.5 to about 2.5 ~~pph~~ parts per hundred by weight of toner, and wherein the silicate salt is dissolved in a base

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5. **(Original)** A process in accordance with claim 2 comprising

(i) mixing said colorant dispersion containing pigment, water and an anionic surfactant, and wherein said wax dispersion added is comprised of submicron wax particles of from about 0.1 to about 0.5 micron in diameter by volume, and which wax is dispersed in water and an anionic surfactant to provide a mixture containing colorant, and a wax;

(ii) blending the resulting mixture of (i) with a first portion of said latex comprised of submicron substantially noncrosslinked polymer of about 150 to about 300 nanometers, and containing water and an anionic surfactant or a nonionic surfactant to provide a blend of colorant, wax and resin;

(iii) wherein the resulting blend possesses a pH of about 2.2 to about 2.8, and to which blend is added a coagulant;

(iv) heating the resulting mixture of (iii) below about the glass transition temperature (T_g) of the latex resin to form toner sized aggregates;

(v) adding to the formed toner aggregates a second portion of the latex (ii) comprised of polymer particles suspended in an aqueous phase containing an ionic surfactant and water;

(vi) adding to the resulting mixture of (v) an aqueous solution of a silicate salt dissolved in a base to thereby change the pH, which is initially from about 2 to about 2.8, to arrive at a pH of from about 7 to about 7.5;

(vii) heating the resulting aggregate mixture of (vi) above about the T_g of the polymer in said latex (ii) to accomplish fusion of said toner components;

(viii) optionally retaining the resulting mixture at a temperature of from about 85°C to about 95°C for an optional period of about

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10 to about 60 minutes, followed by a pH reduction with an acid to arrive at a pH of about 3.8 to about 6;

- (ix) washing the resulting toner slurry; and
- (x) isolating the toner product.

6. **(Canceled)**

7. **(Original)** A process in accordance with **claim 5** wherein said silicate reacts with aluminum contained in the toner aggregates resulting in the substantial extraction of said aluminum.

8. **(Original)** A process in accordance with **claim 5** wherein the pH of (viii) is reduced to about 3.8 to about 6 or to about 4 to about 5.5 to assist coalescence of the polymer, colorant, and wax.

9. **(Original)** A process in accordance with **claim 2** wherein said silicate salt is selected from the group consisting of sodium silicate ($\text{Na}_2\text{O}/\text{SiO}_2$) dissolved in sodium hydroxide, and potassium silicate ($\text{K}_2\text{O}/\text{SiO}_2$) dissolved in potassium hydroxide, and wherein said coagulant is a polymetal halide.

10. **(Original)** A process in accordance with **claim 2** wherein said sodium silicate is $\text{SiO}_2\text{:Na}_2\text{O}$ of a weight ratio of about 1.6 to about 3.2.

11. **(Original)** A process in accordance with **claim 2** wherein said silicate extracts from about 50 to about 98 percent of aluminum, Ca, Mn, Mg, Zn, Ni, or mixtures thereof.

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12. **(Original)** A process in accordance with **claim 1** wherein said coagulant is selected from the group consisting of polyaluminum chloride (PAC), polyaluminum sulfo silicate (PASS), aluminum sulfate, zinc sulfate, and magnesium sulfate in an amount of about 0.02 to about 3 pph by weight of toner.

13. **(Original)** A process in accordance with **claim 1** wherein about 5 to about 50 percent of said coagulant is retained in said toner product, and optionally wherein an image developed with said toner possesses a gloss of about 90 to about 50 ggu.

14. **(Original)** A process in accordance with **claim 1** wherein said colorant comprises particles of cyan, yellow, magenta, black, orange, red, green, or mixtures thereof dispersed in water and an anionic surfactant, and wherein said colorant is present in an amount of from about 4 to about 12 weight percent.

15. **(Original)** A process in accordance with **claim 1** wherein said coagulant is a polymetal halide present in an amount of about 0.02 to about 3 percent by weight of toner.

16. **(Original)** A process in accordance with **claim 1** wherein the coagulant is a polymetal halide selected in an amount of about 0.05 to about 0.5 percent by weight of toner.

17. **(Original)** A process in accordance with **claim 5 (viii)** wherein said acid is nitric, sulfuric, hydrochloric, citric or acetic acid.

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18. **(Original)** A process in accordance with **claim 5** wherein there is added to the formed toner aggregates of (v) said second portion of said latex comprised of submicron resin particles suspended in an aqueous phase containing an anionic surfactant, and wherein said second latex is selected in an amount of from about 10 to about 40 percent by weight of the initial latex (i) to form a shell thereover on said formed aggregates, and which shell is of an optional thickness of about 0.2 to about 0.8 micron.

19. **(Currently Amended)** A process in accordance with **claim 5** ~~(v)~~ wherein said added latex contains the same polymer as the initial latex of (i), or wherein said added latex contains a dissimilar polymer than that of the initial latex.

20. **(Original)** A process in accordance with **claim 5** wherein the pH of the mixture resulting in (vi) is increased from about 2 to about 2.6 to about 7 to about 7.4, and wherein said silicate salt dissolved in a base functions primarily as a stabilizer for the aggregates during coalescence (vii), and no or minimal toner particle size increase results, and wherein said coagulant is a polymetal halide.

21. **(Original)** A process in accordance with **claim 5** wherein the aggregation temperature (iv) is from about 45°C to about 60°C, and wherein the coalescence or fusion temperature of (vii) and (viii) is from about 80°C to about 95°C.

22. **(Original)** A process in accordance with **claim 5** wherein the time of coalescence or fusion of (vii) is from about 3 to about 6 hours, and wherein the toner resulting possesses a smooth morphology.

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23. **(Original)** A process in accordance with **claim 1** wherein said latex contains a polymer selected from the group comprised of poly(styrene-alkyl acrylate), poly(styrene-1,3-diene), poly(styrene-alkyl methacrylate), poly(alkyl methacrylate-alkyl acrylate), poly(alkyl methacrylate-aryl acrylate), poly(aryl methacrylate-alkyl acrylate), poly(alkyl methacrylate), poly(styrene-alkyl acrylate-acrylonitrile), poly(styrene-1,3-diene-acrylonitrile), poly(alkyl acrylate-acrylonitrile), poly(styrene-butadiene), poly(methylstyrene-butadiene), poly(methyl methacrylate-butadiene), poly(ethyl methacrylate-butadiene), poly(propyl methacrylate-butadiene), poly(butyl methacrylate-butadiene), poly(methyl acrylate-butadiene), poly(ethyl acrylate-butadiene), poly(propyl acrylate-butadiene), poly(butyl acrylate-butadiene), poly(styrene-isoprene), poly(methylstyrene-isoprene), poly(methyl methacrylate-isoprene), poly(ethyl methacrylate-isoprene), poly(propyl methacrylate-isoprene), poly(butyl methacrylate-isoprene), poly(methyl acrylate-isoprene), poly(ethyl acrylate-isoprene), poly(propyl acrylate-isoprene), poly(butyl acrylate-isoprene), poly(styrene-propyl acrylate), poly(styrene-butyl acrylate), poly(styrene-butadiene-acrylonitrile), and poly(styrene-butyl acrylate-acrylonitrile).

24. **(Original)** A process in accordance with **claim 1** wherein said latex contains a polymer with a carboxylic acid selected from the group comprised of acrylic acid, methacrylic acid, itaconic acid, beta carboxy ethyl acrylate, fumaric acid, maleic acid, and cinnamic acid, and wherein carboxylic acid is selected in an amount of from about 0.1 to about 10 weight percent.

25. **(Original)** A process in accordance with **claim 1** wherein said wax dispersion contains a polyethylene, a polypropylene wax, or mixtures thereof, water, and an anionic surfactant, and wherein said wax is selected in an amount of from about 5 to about 20 weight percent.

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26. **(Original)** A process comprising heating a mixture of colorant dispersion, a resin latex, and a coagulant, and wherein said heating involves a first heating and subsequently a second heating, and which second heating is at a higher temperature than said first heating, and wherein said second heating is above about the glass transition temperature of said resin, and which process is accomplished in the presence of a silicate salt.

27. **(Original)** A process in accordance with claim 26 wherein said latex polymer possesses a molecular weight M_w of about 20,000 to about 500,000, and an onset glass transition (T_g) temperature of from about 45°C to about 55°C.

28. **(Original)** A process in accordance with claim 26 wherein said latex resin is selected in an amount of from about 65 to about 85 weight percent, further adding a wax selected in an amount of from about 5 to about 15 weight percent, and said colorant is selected in the amount of 3 to about 15 percent, and wherein the total thereof of said components is about 100 percent based on said toner.

29. **(Original)** A process in accordance with claim 26 wherein said resulting toner possesses a shape factor of from about 120 to about 148.

30. **(Original)** A process in accordance with claim 26 wherein said silicate salt extracts from about 50 to about 98 percent of ions of Al, Ca, Mn, Mg, Zn, Ni or mixtures thereof.

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30. **(Original)** A process in accordance with **claim 1** wherein the colorant dispersion contains a pigment in an amount of about 3 to about 10 percent by weight, said wax is selected in an amount of about 5 to about 15 percent by weight, said latex polymer is selected in an amount of about 80 to about 90 percent by weight of toner, said metal ion is aluminum present in an amount of from about 500 to about 1,000 parts per million (ppm), said coagulant is polyaluminum chloride present in an amount of from about 1,000 to about 2,000 parts per million; and wherein said silicate salt extracts said aluminum, and there results in said toner from about 50 to about 500 parts per million of said aluminum.

31. **(Original)** A process comprising heating a mixture of colorant and latex in the presence of a coagulant and a silicate salt, and wherein said heating comprises a first heating equal to or below about the glass transition temperature of a polymer contained in said latex, and a second heating equal to or about the glass transition temperature of a polymer contained in said latex; wherein said first heating enables the formation of aggregates and said second heating enables the fusion of said colorant and said polymer; and optionally wherein said silicate is contained in an alkali metal hydroxide.

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32. **(New)** A toner process comprised of a first heating of a colorant dispersion, a latex emulsion, and a wax dispersion in the presence of a coagulant containing a metal ion; adding a silicate salt; followed by a second heating, and wherein said first heating enables toner aggregates, and said second heating provides coalesced toner particles, and wherein said first heating is below about the glass transition temperature of a polymer contained in said latex; and said second heating is above about the glass transition temperature of the polymer contained in said latex, and wherein said latex contains a polymer optionally selected from the group comprised of poly(styrene-alkyl acrylate), poly(styrene-1,3-diene), poly(styrene-alkyl methacrylate), poly(alkyl methacrylate-alkyl acrylate), poly(alkyl methacrylate-aryl acrylate), poly(aryl methacrylate-alkyl acrylate), poly(alkyl methacrylate), poly(styrene-alkyl acrylate-acrylonitrile), poly(styrene-1,3-diene-acrylonitrile), poly(alkyl acrylate-acrylonitrile), poly(styrene-butadiene), poly(methylstyrene-butadiene), poly(methyl methacrylate-butadiene), poly(ethyl methacrylate-butadiene), poly(propyl methacrylate-butadiene), poly(butyl methacrylate-butadiene), poly(methyl acrylate-butadiene), poly(ethyl acrylate-butadiene), poly(propyl acrylate-butadiene), poly(butyl acrylate-butadiene), poly(styrene-isoprene), poly(methylstyrene-isoprene), poly(methyl methacrylate-isoprene), poly(ethyl methacrylate-isoprene), poly(propyl methacrylate-isoprene), poly(butyl methacrylate-isoprene), poly(methyl acrylate-isoprene), poly(ethyl acrylate-isoprene), poly(propyl acrylate-isoprene), poly(butyl acrylate-isoprene), poly(styrene-propyl acrylate), poly(styrene-butyl acrylate), poly(styrene-butadiene-acrylonitrile), and poly(styrene-butyl acrylate-acrylonitrile).